Compressed Fluid Density Measurements for R-32

J.C. Holste, M. Villamañan Olfos and H.A. Duarte Garza
Department of Chemical Engineering
Texas A&M University
College Station TX 77843-3122

Experimental measurements of compressed fluid densities for difluoromethane (R-32) are reported. The measurements, which were obtained using a continuously weighed pycnometer of local design, constitute eight isotherms ranging from 150 to 375 K at pressures to 70 MPa. The temperature range for these measurements is from slightly above the freezing point to slightly above the critical temperature. The details of the measurement procedure and a quantitative analysis of experimental errors also will be presented. Our results will be compared with those reported previously by other workers and the accepted equations of state for R-32.

The pycnometer consists of a cell of approximately 10 cm^3 volume which is suspended from an electronic balance. The connections are aligned in such a way to allow accurate weighing while the fluid transmission line is connected to the cell. This provides for rapid measurements, and for an apparatus which is capable of providing a large number of density measurements in the supercritical region where the density changes rapidly with pressure, but where no phase changes occur.

The experimental values were measured using a sample provided by the Environmental Protection Agency with a stated purity of 99.99%. Additional gas chromatography tests in our laboratories were unable to detect the presence of any impurities, thereby verifying that no sample contamination had occurred subsequent to the preparation and shipping of the sample.